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THE COOPERATIVE MARINE MAMMAL SALVAGE PROGRAM: REPORT ON STRANDINGS OF DEAD ANIMALS IN 1981

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by

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The Cooperative Marine Mammal Salvage Program (CMMSP) is an organization of institutions in San Diego County, California, that investigates marine mammal strandings along the San Diego County coastline (Henderson and Hansen, 1981). The Southwest Fisheries Center (SWFC) is a member of the CMMSP and is responsible for investigating strandings of dead marine mammals. The strandings of 140 dead marine mammals were investigated by the SWFC during 1981. One-hundred-and-twenty-two were from the San Diego County coastline, 8 from San Clemente Island, 8 from San Miguel Island, and 3 from other areas of California (Table 1). Ten species were represented: 4 of pinnipeds and 6 of cetaceans. Eighty-two percent were California sea lions (Zalophus californianus). All the specimens are listed in Appendix I.

DISTRIBUTION

The distribution of strandings along the San Diego County coastline is shown in Figure 1. Seventy-five percent occurred in the area between Las Flores Creek and Mission Bay, which represents 49% of the coastline. From 1966 to 1980 the highest number of strandings occurred in the area between La Jolla Point and Penasquitos Lagoon (Henderson and Hansen, 1981); this was also true for 1981 but to a much smaller degree.

SEASONALITY

Figure 2 illustrates the number of strandings recovered on San Diego County mainland coastline by month. Twenty percent were recovered during May; 51% were recovered during the period from March through June. The pattern generally followed that reported for 1966-1980 by Henderson and Hansen (1981).

NECROPSY RESULTS

Thirty-four specimens were necropsied; all but 4 were sea lions. The results are listed in Table 2. The most common cause of death was human-related; of the 30 sea lions, 37% died of gunshot wounds or drowning. Eighteen percent were caused by hypoglycemia, 5 by infection/sepsis, 2 by neoplastic disease, 1 by parasite-induced brain lesions, 1 by an acute allergic reaction, 4 were too decomposed for diagnosis, and 1 remains undiagnosed. Nearly 70% of the sea lions exhibited gastric ulcerations that were significant, being multiple and active erosions.

SPECIMEN DISPOSITION

The specimen disposition is detailed in Appendix I.

SPECIMENS COLLECTED

Appendix I lists the parts collected from each specimen. Teeth and stomach contents were always collected when present. Other samples were collected depending on the species, age, and state of decomposition of the animal. The tooth samples and stomach contents of the sea lions and harbor seals (Phoca vitulina) are currently being utilized in age-determination and food-habit studies by the Coastal Marine Mammal Project at the SWFC.

RESPONSE

Beginning in June 1981, records were maintained of all reports of stranded marine mammals received from the Cooperative Marine Mammal Salvage Program hot-line. From June through December, 77 calls for dead marine mammals were forwarded to the CMMSP. Of these, 67 resulted in the recovery of specimens. Two calls were for large sharks, mistakenly identified as whales, and 8 were for animals that were not found or were calls to which personnel were unable to respond for various reasons.

REPORTING

All of the recovered strandings were reported to the Scientific Event Alert Network of the Smithsonian Institution, which published a monthly bulletin of all reported strandings. Beginning in late 1981, strandings were also reported to the Southwest Regional Office of the National Marine Fisheries Service in Terminal Island, California.

ANALYSIS OF Z. CALIFORNIANUS STRANDINGS

A total of 108 specimens of Z. californianus were collected from the San Diego County coastline. Tooth samples were collected from 40% of the specimens and stomach contents were collected from 24%. Standard lengths (Scheffer, 1967) were taken from 106 specimens, and the sex is known for 100 specimens. The teeth and stomach samples are currently being analyzed and will be reported on elsewhere. An analysis of lengths, sex, and time of strandings is given here.

There is a definite pattern in the seasonality of strandings of smaller (therefore younger) animals. Figure 3 shows the pattern of Z. californianus strandings by sex; from May through June, both sexes have a high number of strandings of small animals (100 cm-130 cm), which are probably yearlings.

For males, the stranding of yearlings continues into September. The average lengths of the smaller animals (especially the males) increase from May through September (Figure 3) and may reflect their growth rate; however, confirmation of this must wait until ages have been determined for the specimens.

The strandings of animals 160cm and above occurred at a fairly constant rate throughout the year, with a notable exception. During August and September there was an influx of males 205 cm long and greater (Figure 3). This is just after the breeding season (Antonelis and Fiscus, 1980); these males may represent some of those that succumb to the stresses of the breeding season.

California sea lions are markedly sexually dimorphic and this is clearly shown in Figure 3. Adult females range from 150-200 cm while adult males range from 200-250 cm (Peterson and Bartholomew, 1967). All of the stranded females were under 200 cm, but 11 of the males were over 200 cm.

Figure 4 show two peaks in the lengths of stranded Z. californianus. The largest peak (100-120 cm) probably represents yearlings and may reflect the not unexpected higher mortality rate of young animals. The other peak (161-180 cm) represents at least two different age/sex classes. While females of this size are mature, the males are not. The causes of the 161-180 cm peak are not clear. There are not enough necropsy data for this size of animal to allow any conclusions to be drawn.

Necropsies were conducted on 28% of the sea lions. Of these, 39% died of drowning or gunshot wounds, probably as the result of some fisheries interaction. Half of the animals drowned, presumably in nets; 66% of these were collected in the same area within one week and were probably victims of the same fishery. All of the drowning victims were males and only one of the gunshot victims was female. None of these sea lions were adults; the female was 112 cm long and the males ranged from 116 cm to 174 cm. Sixty-six percent of the males were yearlings, ranging in size from 116 cm to 132 cm.

LITERATURE CITED

- Antonelis, G. A. Jr., and C. H. Fiscus. 1980. The pinnipeds of the California current. North, N. (editor) CALCOFI Report, Vol. XXI. La Jolla, California, 68-78.
- Henderson, J. R. and L. J. Hansen. 1983. Stranded marine mammals recovered by the Southwest Fisheries Center 1966-1980. Southwest Fisheries Center, Admin. Rep. No. LJ-83- (in prep), La Jolla, CA. 37 pp.
- Peterson, R. S., and G. A. Bartholomew. 1967. The natural history and behavior of the California sea lion. Amer. Soc. Mamm. Spec. Pub. No. 1., 79 pp.
- Scheffer, V. B. 1967. Standard measurements of seals. J. Mamm., 48(3):459-462.

Table 1. Numbers and percentages of stranded dead marine mammals investigated by MMSP during 1981, listed by species and location.

SPECIES	San Diego County Mainland		San Clemente Island		San Miguel Island		Other		Total	
	No.	Perc.	No.	Perc.	No.	Perc.	No.	Perc.	No.	Perc.
<u>Zalophus californianus</u>	106	86.9	8	100	-	-	1 ¹	33.3	115	81.6
<u>Phoca vitulina</u>	3	2.5	-	-	1	12.5	1 ¹	33.3	5	3.5
<u>Mirounga angustirostris</u>	3	2.5	-	-	-	-	-	-	3	2.1
<u>Callorhinus ursinus</u>	-	-	-	-	-	-	1 ²	33.3	1	0.7
<u>Delphinus delphis</u>	1	0.8	-	-	2	25.0	-	-	3	2.1
<u>Lagenorhynchus obliquidens</u>	1	0.8	-	-	2	25.0	-	-	3	2.1
<u>Lissodelphis borealis</u>	1	0.8	-	-	2	25.0	-	-	3	2.1
<u>Tursiops truncatus</u>	3	2.5	-	-	-	-	-	-	3	2.1
<u>Eschrichtius robustus</u>	1	0.8	-	-	-	-	-	-	1	0.7
<u>Globicephala macrorhynchus</u>	-	-	-	-	1	12.5	-	-	1	0.7
Unidentified pinnipeds	2	1.6	-	-	-	-	-	-	2	1.4
TOTAL	122		8		8		3		140	

¹Near Salinas River State Beach, California

²Pacific Grove, California

Table 2. Synopsis of necropsy results for 1981.

I.D.	Species	Estimated Age	Gross Pathology	Histologic Pathology	Contributory Cause of Death	Primary Cause of Death	Parasites Species	Location	No.
JRH-103	<u>Zalophus californianus</u>	adult	Metastatic neoplasm	-	-	Metastatic neoplasm	None		
JRH-104	<u>Zalophus californianus</u>	sub-adult	Open	Severe autolysis	-	Open (possible) drowning	None		
JRH-105	<u>Zalophus californianus</u>	yearling	Gastric ulceration, Possible hepatitis	N.D. (autolysis)	-	Possible drowning	None		
JRH-106	<u>Zalophus californianus</u>	2 years	Open	N.D. (autolysis)	-	Possible drowning	<u>Contracaecum osculatum</u> , <u>Zalophotrema hepaticum</u>	Stomach Bile	<50 <10
JRH-108	<u>Zalophus californianus</u>	yearling	Open	N.D. (autolysis)	-	Possible drowning	<u>Contracaecum osculatum</u>	Stomach	<10
JRH-116	<u>Zalophus californianus</u>	yearling	Emaciation, Gastric ulceration	-	Gastric ulceration	Exposure-hypoglycemia	None		
JRH-127	<u>Zalophus californianus</u>	yearling	Subcutaneous hemorrhage, Gastric ulceration	N.D. (autolysis)	Gastric ulceration	Sepsis	<u>Contracaecum osculatum</u>	Stomach	<100
JRH-129	<u>Zalophus californianus</u>	sub-adult	Gastric ulceration	N.D. (autolysis)	Gastric ulceration	Open (severe autolysis)	<u>Contracaecum osculatum</u>	Stomach	<100

Table 2 - continued

I.D.	Species	Estimated Age	Gross Pathology	Histologic Pathology	Contributory Cause of Death	Primary Cause of Death	Species	Parasites	Location	No.
JRH-130	<u>Zalophus californianus</u>	yearling	Gastric ulceration, Hole in cranium	N.D. (autolysis)	Gastric ulceration	Gunshot wound	None			
JRH-133	<u>Zalophus californianus</u>	yearling	Emaciation, Atelectasis	-	-	Exposure-hypoglycemia	<u>Parafilaroides decorus</u> , <u>Contracaecum osculatum</u> , <u>Diphylllobothrium pacificum</u>		Lung Stomach Intestine	Light <100 Heavy
JRH-136	<u>Zalophus californianus</u>	adult	Emaciation, Gastric ulceration	N.D. (autolysis)	Gastric ulceration	Open (severe autolysis)	<u>Contracaecum osculatum</u>		Stomach	<50
JRH-139	<u>Zalophus californianus</u>	yearling	Emaciation, Gastric ulceration, Peritonitis	N.D. (autolysis)	Gastric ulceration	Perforated gastric ulcer (severe autolysis)	None			
JRH-140	<u>Zalophus californianus</u>	yearling	Gastric ulceration, Cervical and Thoracic puncture	-	Gastric ulceration	Gunshot wound (collapsed lung and SQ emphysema)	<u>Contracaecum osculatum</u>		Stomach	<10
JRH-141	<u>Delphinus delphis</u>	adult	Mitral endocardiosis, Hepatitis, Brain necrosis	N.D. (autolysis)	Hepatitis necrosis	Cerebellar	<u>Nasitrema delphini</u>		Brain	Light

Table 2 - continued

I.D.	Species	Estimated Age	Gross Pathology	Histologic Pathology	Contributory Cause of Death	Primary Cause of Death	Parasites Species	Location	No.
JRH-142	<u>Zalophus californianus</u>	yearling	Emaciation, Pulmonary atelectasis, Gastric ulceration	-	Gastric ulceration	Exposure-hypoglycemia	<u>Contracaecum osculatum</u> , <u>Diphyllbothrium pacificum</u>	Stomach Intestine	>100 Light
JRH-143	<u>Zalophus californianus</u>	yearling	Emaciation, Gastric ulceration	N.D. (autolysis)	Gastric ulceration	Exposure-hypoglycemia	<u>Contracaecum osculatum</u> , <u>Diphyllbothrium pacificum</u>	Stomach Intestine	<10 Light
JRH-144	<u>Zalophus californianus</u>	yearling	Emaciation, Pulmonary atelectasis, Gastric ulceration	-	Gastric ulceration, Pulmonary atelectasis	Exposure-hypoglycemia, Sepsis	<u>Parafilaroides decorus</u> , <u>Contracaecum osculatum</u> , <u>Diphyllbothrium pacificum</u>	Lung Stomach Intestine	Heavy >100 Light
JRH-145	<u>Zalophus californianus</u>	yearling	Gastric ulceration	N.D. (autolysis)	Gastric ulceration	Open (severe autolysis)	<u>Contracaecum osculatum</u>	Stomach	<10
JRH-147	<u>Zalophus californianus</u>	yearling	Emaciation, Gastric ulceration	N.D. (autolysis)	Gastric ulceration	Exposure-hypoglycemia	?Nematode, <u>Diphyllbothrium pacificum</u>	Stomach Intestine	<50 Light
JRH-148	<u>Zalophus californianus</u>	yearling	Abdominal puncture, Evisceration, Gastric ulceration	N.D. (autolysis)	Gastric ulceration	Gunshot wound (intestinal evisceration and hemorrhage)	<u>Contracaecum osculatum</u> , <u>Diphyllbothrium pacificum</u>	Stomach Intestine	<10 Light

Table 2 - continued

I.D.	Species	Estimated Age	Gross Pathology	Histologic Pathology	Contributory Cause of Death	Primary Cause of Death	Parasites Species	Location	No.
JRH-149	<u>Mirounga angustirostris</u>	6 months	Broncho-pneumonia, Gastric ulceration	N.D. (autolysis)	Parasitic pneumonia, Gastric ulceration	Bronchopneumonia, Sepsis	Parafilaroides sp., <u>Contracaecum osculatum</u> , <u>Dipyllobothrium pacificum</u>	Lung Stomach Intestine	Heavy <100 Light
JRH-152	<u>Zalophus californianus</u>	sub-adult	Cranium puncture, Abdominal puncture	N.D. (autolysis)	-	Gunshot wound to head and abdomen (severe autolysis)	Not examined		
JRH-154	<u>Zalophus californianus</u>	adult	Mammary mass S.Q. hemorrhage, Gastric ulceration, Pulmonary abscesses	N.D. autolysis)	Gastric ulceration, Pulmonary abscesses	Mammary carcinoma with hemorrhage	<u>Contracaecum osculatum</u>	Stomach	<100
JRH-160	<u>Lissodelphis borealis</u>	adult	Mitral endocarditis	-	-	Open	<u>Anisakis simplex</u>	Stomach	<10
JRH-171	<u>Zalophus californianus</u>	yearling	Peri-cranial hemorrhage and edema	N.D. (autolysis)	-	Possible acute allergic reaction	<u>Parafilaroides decorus</u> , <u>Contracaecum osculatum</u> , <u>Zalophotrema hepaticum</u> , <u>Dipyllobothrium pacificum</u>	Lung Stomach Liver Intestine	Light >50 <5 Mod.

Table 2 - continued

I.D.	Species	Estimated Age	Gross Pathology	Histologic Pathology	Contributory Cause of Death	Primary Cause of Death	Species	Parasites	Location	No.
JRH-173	<u>Zalophus californianus</u>	adult	Gastric ulceration	N.D.	Gastric ulceration	Open				
JRH-176	<u>Zalophus californianus</u>	yearling	-	Pending	-	Possible drowning	<u>Parafilaroides decorus</u>		Lung	Light
JRH-177	<u>Phoca vitulina</u>	infant	-	Pending	-	Possible drowning	Negative			
JRH-178	<u>Zalophus californianus</u>	yearling	Gastric ulceration	Pending	-	Possible drowning	<u>Parafilaroides decorus</u>		Lung	Light
JRH-181	<u>Zalophus californianus</u>	adult	Emaciation, Parasitic pneumonia, Parasitic cholecystitis, Adrenal cyst	N.D. (autolysis)	Parasitic pneumonia, Parasitic cholecystitis	Sepsis, Hepatitis?	<u>Parafilaroides decorus</u> , <u>Contracaecum osculatum</u> , <u>Zalophotrema hepaticum</u>		Lung Stomach Bile ducts	Heavy >200 <10
JRH-189	<u>Zalophus californianus</u>	sub-adult	-	N.D. (autolysis)	-	Gunshot wound (head)				
JRH-202	<u>Zalophus californianus</u>	sub-adult	Gastric ulceration	N.D. (autolysis)	-	Gunshot wound (head)				
JRH-216	<u>Zalophus californianus</u>	adult	Emaciation, Parasitic pneumonia, Parasitic cholecystitis, Bile duct, cyst? Gastric ulceration, Pericarditis insufficiency	N.D. (autolysis)	Parasitic pneumonia, Gastric ulceration, Bile duct cyst, Pericarditis, Mitral insufficiency	Sepsis, Obstructive Lung Disease	<u>Parafilaroides decorus</u> , <u>Contracaecum osculatum</u> , <u>Zalophotrema hepaticum</u>		Lung Stomach Bile ducts	Heavy <100 <20

Table 2 - continued

I.D.	Species	Estimated Age	Gross Pathology	Histologic Pathology	Contributory Cause of Death	Primary Cause of Death	Parasites Species	Location	No.
JRH-226	<u>Zalophus californianus</u>	yearling	Emaciation, Gastric ulceration, Parasitic pneumonia	N.D. (autolysis)	Parasitic pneumonia, Gastric ulceration	Sepsis, Obstructive Lung Disease	<u>Parafilaroides decorus</u> , <u>Contracaecum osculatum</u>	Lung Stomach	Heavy 50

APPENDIX I - Stranded dead marine mammals
investigated by SWFC during 1981.

Date	Sex	Length, cm	Locality	Field Number	Disposition ⁶		
					Parts coll. ⁵	Carcass	Parts coll.
California sea lion, <u>Zalophus californianus</u>							
01/17/81	F	168	Imperial Beach	JRH 099	----	LF	----
02/26/81	M	213	La Jolla	JRH 102	Sk,St	LF	SWFC
03/09/81	F	173	San Diego Bay	JRH 103	Enp	LF	SWFC
03/13/81	M	169	Mission Beach	JRH 104	St	LF	SWFC
03/15/81	M	132	Pacific Beach	JRH 105	Ts,St	LF	SWFC
03/16/81	M	130	Mission Beach	JRH 106	St	LF	SWFC
03/17/81	F	150 ¹	Leucadia	JRH 107	----	BS	----
03/17/81	M	121	Pacific Beach	JRH 108	Ts,St	LF	SWFC
03/17/81	F	166	Pacific Beach	JRH 109	Enp	LF	SWFC
03/20/81	M	175	Torrey Pines	JRH 110	----	LF	----
03/23/81	F	179	La Jolla	JRH 111	----	LF	----
03/23/81	? ²	157	Leucadia	JRH 112	----	LF	----
03/26/81	M	142	Cardiff	JRH 113	St	LF	SWFC
04/03/81	? ²	158	Carlsbad	JRH 114	----	LF	----
04/07/81	M	177	La Jolla	JRH 115	----	LF	----
04/06/81	M	93	Carlsbad	JRH 116	St	LF	SWFC
04/17/81	? ²	105	Coronado	JRH 117	St	LF	SWFC
04/17/81	? ²	154	Torrey Pines	JRH 118	----	LF	----
04/17/81	M	163	Camp Pendleton	JRH 119	----	LF	----
04/23/81	F	98	Mission Bay	JRH 121	----	LF	----
04/23/81	F	184	Mission Beach	JRH 122	Ecp	LF	SWFC
04/27/81	M	152	Carlsbad	JRH 123	Th	LF	SWFC
04/29/81	M	138	Imperial Beach	JRH 124	Th	LF	SWFC
04/30/81	M	215	Ocean Beach	JRH 125	Sk,Bc	LF	SWFC
05/04/81	M	196	Black's Beach	JRH 126	St	LF	SWFC
05/04/81	M	117	Black's Beach	JRH 127	----	LF	----
05/06/81	M	175	La Jolla	JRH 129	----	LF	----
05/08/81	M	123	San Onofre	JRH 130	St	LF	SWFC
05/11/81	F	120	Coronado	JRH 131	----	BS	----
05/12/81	M	110	Del Mar	JRH 133	Enp	LF	SWFC
05/12/81	M	108	Carlsbad	JRH 134	----	LF	----
05/12/81	F	133	Leucadia	JRH 135	St	LF	SWFC
05/18/81	F	108	San Onofre	JRH 136	Sk	LF	SWFC
05/21/81	F	79	Leucadia	JRH 137	----	LF	----
05/21/81	F	174	Carlsbad	JRH 138	Sk,Enp	LF	SWFC
05/20/81	M	116	Camp Pendleton	JRH 139	Sk	LF	SWFC

APPENDIX I - continued

Date	Sex	Length cm	Locality	Field Number	Disposition ⁶		
					Parts coll. ⁵	Carcass	Parts coll.

California sea lion, Zalophus californianus - continued

05/24/81	F	112	Carlsbad	JRH 140	Ecp	LF	SWFC
05/23/81	M	106	Camp Pendleton	JRH 142	Urine	LF	SWFC
05/23/81	F	105	Camp Pendleton	JRH 143	----	LF	----
05/25/81	M	97	Solana Beach	JRH 144	Enp	LF	SWFC
05/27/81	M	114	San Diego Bay	JRH 145	Sk,St	LF	SWFC
05/28/81	F	106	Mission Beach	JRH 146	---	LF	----
05/29/81	F	103	Mission Bay	JRH 147	Sk,Enp	LF	SWFC
05/29/81	M	117	Carlsbad	JRH 148	St,Enp	LF	SWFC
06/04/81	F	113	Ocean Beach	JRH 150	St,Enp	LF	SWFC
06/04/81	? ²	? ³	San Diego Bay	JRH 151	----	LAS	----
06/05/81	M	164	Cardiff	JRH 152	----	LF	----
06/05/81	F	105	San Diego Bay	JRH 153	----	LF	----
06/06/81	F	181	Imperial Beach	JRH 154	Sk	LF	SWFC
06/09/81	F	103	San Diego Bay	JRH 155	----	LF	----
06/10/81	F	100	Coronado	JRH 156	----	LF	----
06/10/81	M	114	Camp Pendleton	JRH 157	----	LF	----
06/10/81	M	110	Camp Pendleton	JRH 158	----	LF	----
06/18/81	M	109	Imperial Beach	JRH 161	----	LF	----
06/24/81	F	112	Imperial Beach	JRH 162	----	BS	----
06/26/81	M	112	La Jolla	JRH 163	----	LF	----
07/05/81	M	111	Carlsbad	JRH 166	----	LF	----
07/06/81	M	114	Black's Beach	JRH 167	----	LF	----
07/21/81	F	137	Coronado	JRH 168	----	LF	----
07/24/81	M	? ⁴	Pacific Beach	JRH 170	----	LF	----
07/30/81	F	129	San Diego Bay	JRH 171	Th	LF	SWFC
07/30/81	M	190	Mission Bay	JRH 172	----	LF	----
07/31/81	M	189	Black's Beach	JRH 173	Sk,Th	LF	SWFC
08/04/81	M	116	Imperial Beach	JRH 174	----	BS	----
08/04/81	M	225	Imperial Beach	JRH 175	Sk	BS	SWFC
08/0/81	M	123	La Jolla	JRH 176	St,Th	LF	SWFC
08/04/81	M	116	Salinas River St. Beach	JRH 178	St,Th	LF	SWFC
08/05/81	M	231	Encinitas	JRH 180	St,Th	LF	SWFC
08/07/81	F	173	Ocean Beach	JRH 181	----	LF	----
08/11/81	F	187	Carlsbad	JRH 182	----	LF	----
08/10/81	? ²	120	San Diego Bay	JRH 183	Th	LF	SWFC
08/10/81	M	115	San Diego Bay	JRH 184	----	LF	----
08/12/81	F	103	Black's Beach	JRH 185	----	LF	----

APPENDIX I - continued

Date	Sex	Length, cm	Locality	Field Number	Disposition ⁶		
					Parts coll. ⁵	Carcass	Parts coll.
California sea lion, <u>Zalophus californianus</u> - continued							
08/17/81	M	139 ¹	Carlsbad	JRH 186	----	LF	----
08/20/81	M	117	Imperial Beach	JRH 187	Th	LF	SWFC
08/21/81	? ²	146	Carlsbad	JRH 188	----	LF	----
08/24/81	M	174	Carlsbad	JRH 189	----	LF	----
08/24/81	M	287	Cardiff	JRH 190	Th	LF	SWFC
09/06/81	M	208	La Jolla	JRH 193	Th	LF	SWFC
09/09/81	M	127	Carlsbad	JRH 194	Th	LF	SWFC
09/15/81	M	228	Encinitas	JRH 195	Th	LF	SWFC
09/17/81	M	216	Carlsbad	JRH 197	Th	LF	SWFC
09/17/81	M	180	Camp Pendleton	JRH 198	Th,St	LF	SWFC
09/? /81	M	256	Camp Pendleton	JRH 199	----	BS	----
09/22/81	M	130	Solana Beach	JRH 200	Th,St	LF	SWFC
09/24/81	M	174	Torrey Pines	JRH 202	St	LF	SWFC
09/29/81	M	124	Camp Pendleton	JRH 203	St,Th	LF	SWFC
09/29/81	F	174	Camp Pendleton	JRH 204	St,Th	LF	SWFC
10/02/81	F	166	Carlsbad	JRH 205	St,Th	LF	SWFC
10/02/81	M	207	Carlsbad	JRH 213	St,Th	LF	SWFC
10/06/81	M	183	Torrey Pines	JRH 214	St,Th	LF	SWFC
10/06/81	? ²	90 ¹	Imperial Beach	JRH 215	St	LF	SWFC
10/07/81	F	153	Solana Beach	JRH 216	----	LF	----
10/08/81	M	107 ¹	La Jolla	JRH 217	St	LF	SWFC
10/08/81	M	133 ¹	La Jolla	JRH 218	St	LF	SWFC
10/09/81	F	151	La Jolla	JRH 219	St,Th	LF	SWFC
10/15/81	M	? ³	San Clemente Island	JRH 220	Sk	LF	SWFC
10/15/81	? ²	? ³	San Clemente Island	JRH 221	Th	LF	SWFC
10/15/81	? ²	? ³	San Clemente Island	JRH 222	Th	LF	SWFC
10/30/81	M	182	Torrey Pines	JRH 223	Sk	BS	SWFC
11/09/81	M	189 ¹	La Jolla	JRH 224	St	LF	SWFC
11/09/81	M	109	Del Mar	JRH 226	----	LF	----
11/10/81	? ²	156	Mission Beach	LJH 004	----	LF	----
11/12/81	F	148	Carlsbad	LJH 005	----	LF	----
11/15/81	? ²	132	San Clemente Island	MSL 189	Th	LS	SWFC
11/15/81	? ²	102	San Clemente Island	MSL 190	Th	LS	SWFC
11/15/81	? ²	151	San Clemente Island	MSL 191	Th	LS	SWFC
11/15/81	F	165	San Clemente Island	MSL 192	Th	LS	SWFC
11/15/81	M	82	San Clemente Island	MSL 193	Th	LS	SWFC
12/08/81	M	175	Cardiff	LJH 007	----	LF	----
12/09/81	F	169	Encinitas	LJH 008	Th	LF	SWFC

APPENDIX I - continued

Date	Sex	Length, cm	Locality	Field Number	Disposition ⁶		
					Parts coll. ⁵	Carcass	Parts coll.
California sea lion, <u>Zalophus californianus</u> - continued							
12/10/81	M	177	Cardiff	LJH 009	----	LF	----
12/16/81	F	153	Carlsbad	MSL 195	Th	LF	SWFC
12/25/81	M	166	Encinitas	MSL 196	----	LF	----
12/23/81	F	171	Border Field State Park	MSL 197	Th	LF	SWFC
Harbor seal, <u>Phoca vitulina</u>							
05/11/81	F	118	Cardiff	JRH 132	Th	LF	SWFC
06/12/81	F	103	La Jolla	JRH 159	St	LF	SWFC
06/03/81	M	92	Salinas River St. Beach	JRH 177	St,Th	LF	SWFC
09/27/81	M	146	San Miguel Island	JRH 212	Sk,St	LF	NMML
11/09/81	F	97	La Jolla	JRH 225	Th	LF	SWFC
Northern elephant seal, <u>Mirounga angustirostris</u>							
02/24/81	M	150	Mission Beach	JRH 101	Bc	LF	SWFC
05/28/81	M	147	Solana Beach	JRH 149	Sk,St	LF	SWFC
06/30/81	M	152	Cardiff	JRH 164	St,Th	LF	SWFC
Northern fur seal, <u>Callorhinus ursinus</u>							
08/04/81	M	81	Pacific Grove	JRH 179	----	LF	----
Unidentified pinnipeds (probably <u>Z. californianus</u>)							
09/15/81	? ²	128 ¹	Imperial Beach	JRH 196	----	LF	----
09/23/81	M	150 ¹	Torrey Pines	JRH 201	----	LF	----
Common dolphin, <u>Delphinus delphis</u>							
05/25/81	F	180	La Jolla	JRH 141	Sk,Sl	LF	SWFC
06/24/81	? ²	170	San Clemente Island	JRH 165	----	LS	----
09/27/81	F	? ⁴	San Miguel Island	JRH 209	Sk	LS	SWFC
Pacific white-sided dolphin, <u>Lagenorhynchus obliquidens</u>							
04/18/81	M	160	Mission Beach	JRH 120	Sk,Sl,St,Go	LF	SWFC
07/02/81	M	180	San Miguel Island	JRH 206	Sk	LS	SWFC
09/27/81	? ²	? ⁴	San Miguel Island	JRH 208	Sk	LS	SWFC

APPENDIX I - continued

Date	Sex	Length, cm	Locality	Field Number	Disposition ⁶		
					Parts coll. ⁵	Carcass	Parts coll.
Northern right whale dolphin, <u>Lissodelphis borealis</u>							
06/13/81	F	218	Camp Pendleton	JRH 160	Sk,S1,Go	LF	SWFC
09/27/81	? ²	200	San Miguel Island	JRH 207	Sk	LS	SWFC
09/27/81	? ²	200	San Miguel Island	JRH 210	Sk	LS	SWFC
Bottlenose dolphin, <u>Tursiops truncatus</u>							
05/05/81	M	111	Torrey Pines	JRH 128	Th	LF	SWFC
09/03/81	? ²	307	San Onofre	JRH 192	Sk,S1	LF	SWFC
11/14/81	F	235	La Jolla	LJH 006	Sk,Enp,Go	LF	SWFC
Gray whale, <u>Eschrichtius robustus</u>							
01/02/81	M	470	Coronado	JRH 096	Sk	LF	SWFC
Shortfin pilot whale, <u>Globicephala macrorhynchus</u>							
09/27/81	? ²	468	San Miguel Island	JRH 211	Th	LS	SWFC

¹Head missing, length is of carcass.

²Unable to determine sex.

³Unable to determine length.

⁴Length not available.

⁵Parts collected: Bc=baculum, Ecp=ectoparasites, Enp=endoparasites, Go=gonads, S1=skeleton, Sk=Skull, Th-Teeth.

⁶Disposition: BS-buried at site, LF-Disposed of at landfill, LS=left at site, SWFC=Southwest Fisheries Center, NMML=National Marine Mammal Laboratory.

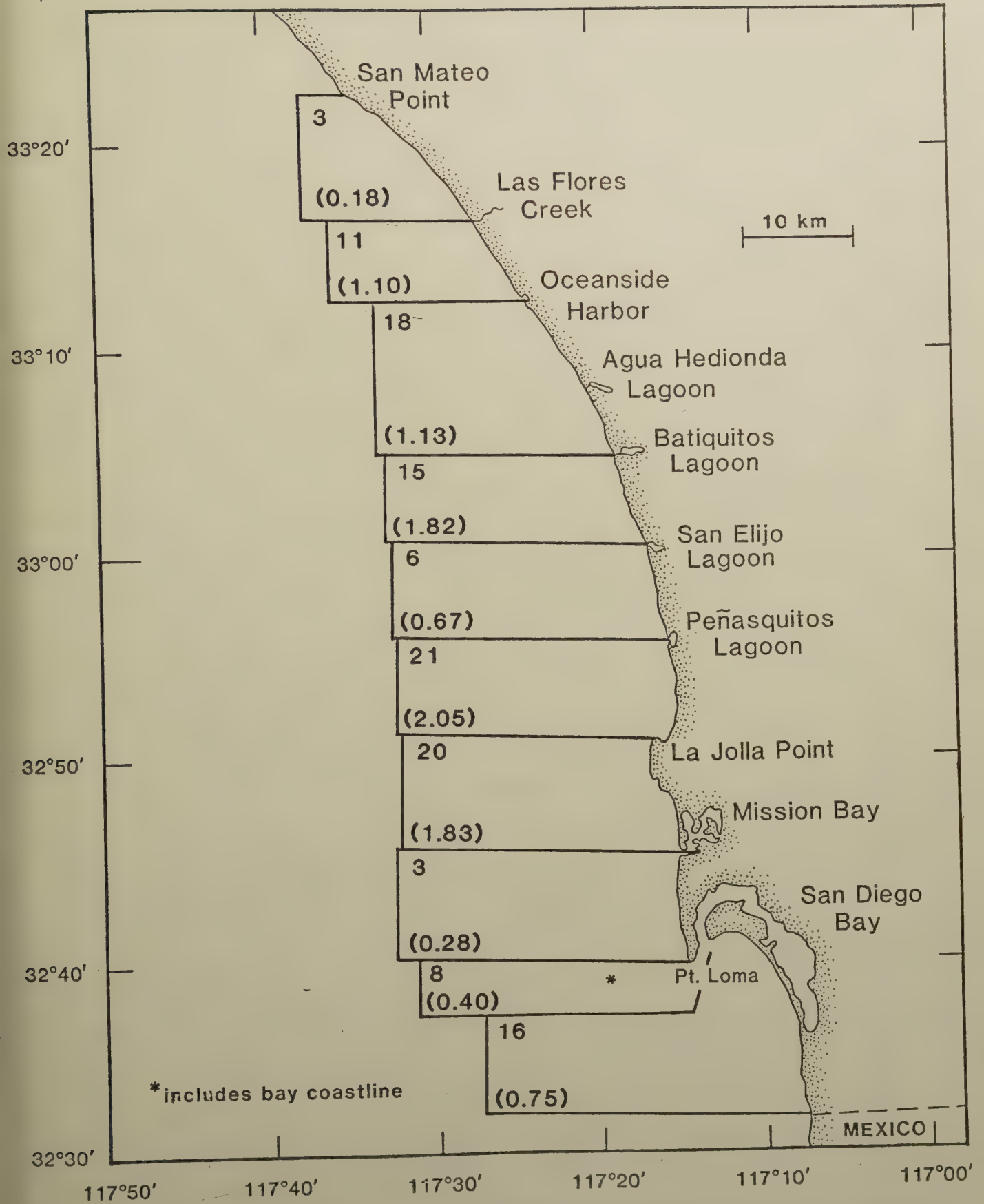


Figure 1. Distribution of strandings of dead marine mammals along the San Diego County coast during 1981.

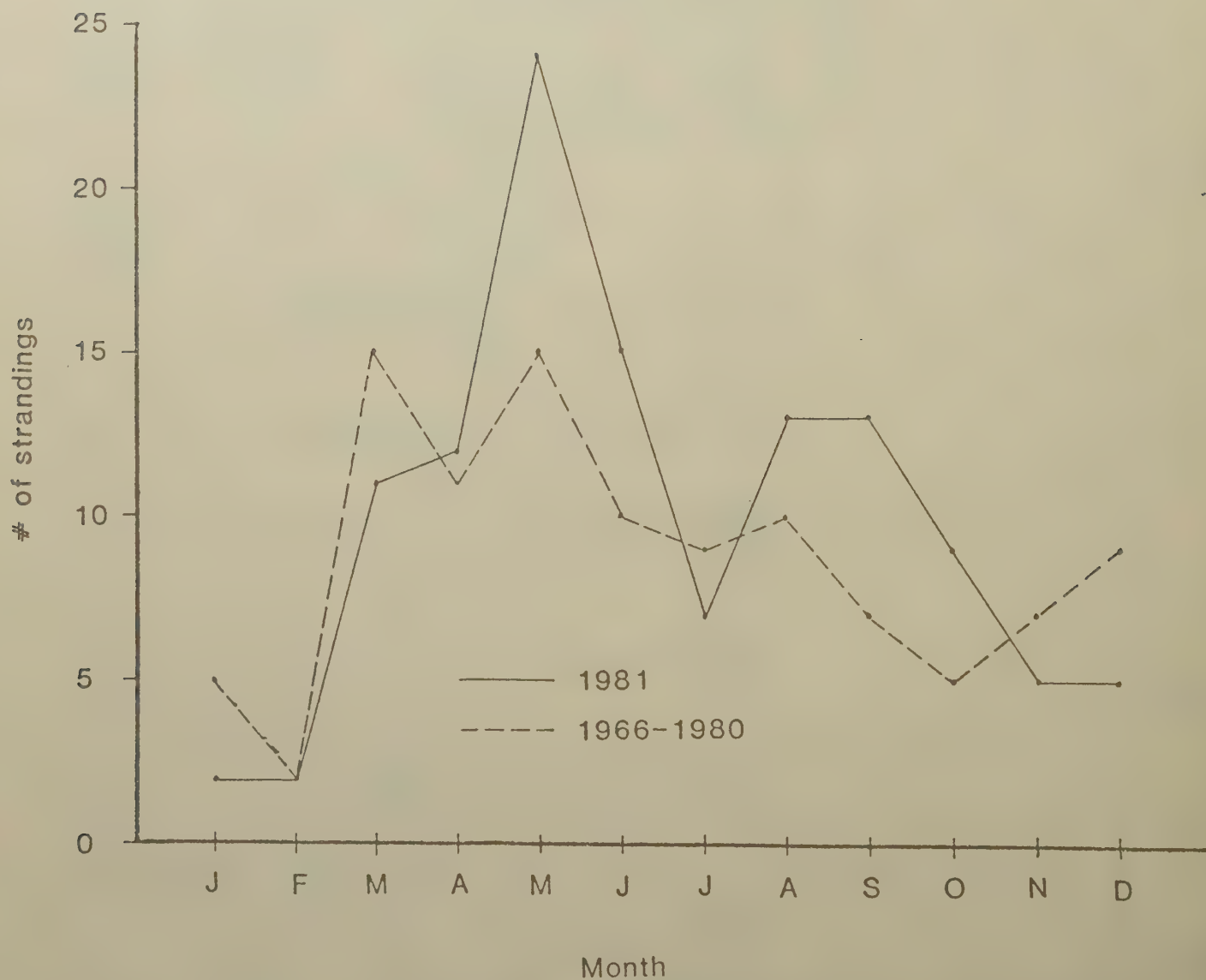


Figure 2. Seasonality of strandings of dead marine mammals on the San Diego County coastline, 1966-1980, and 1981.

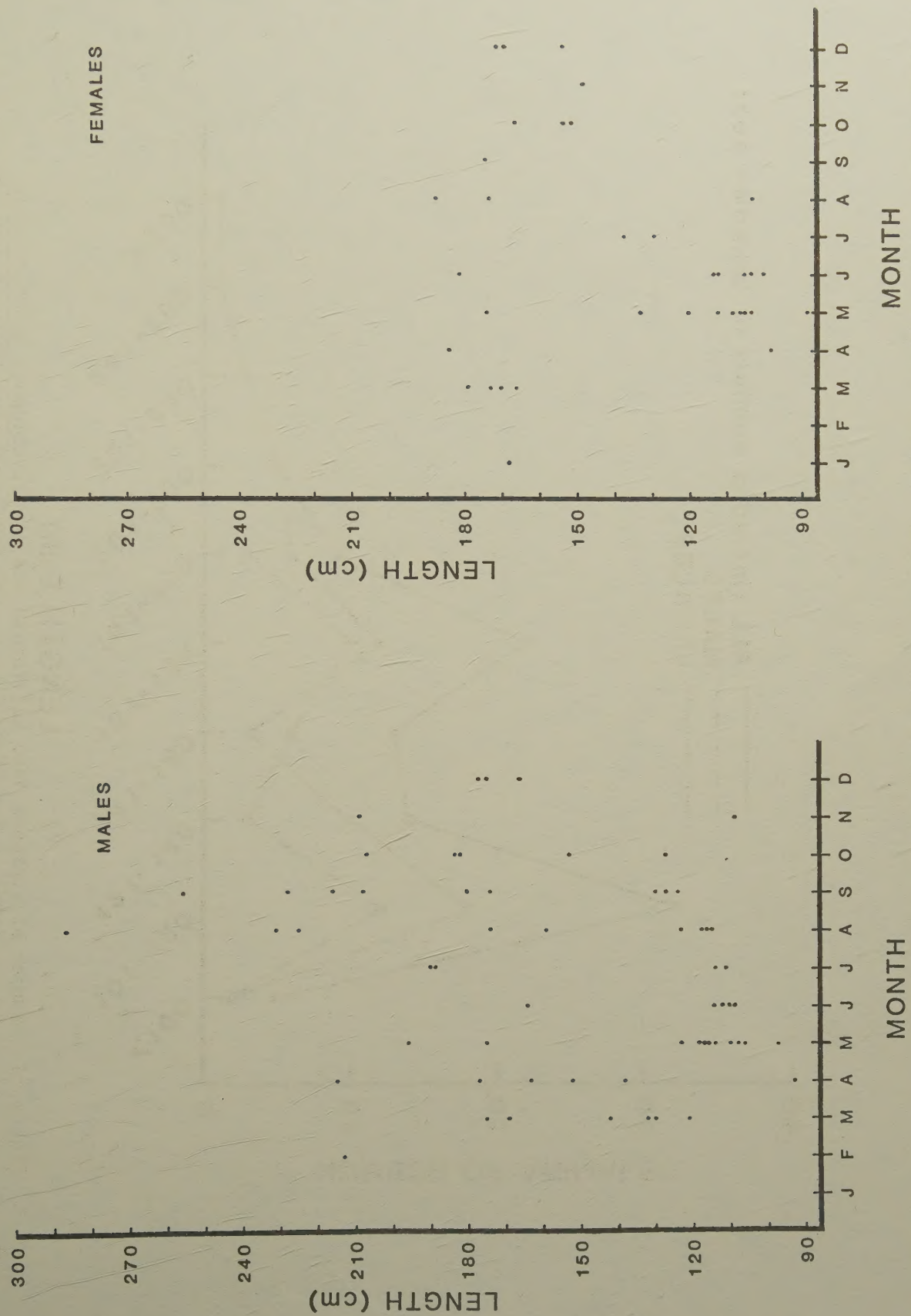


Table 3. Standard length of stranded dead California sea lions, Zalophus californianus, versus month of death, by sex. From specimens investigated in San Diego County, California, during 1981.

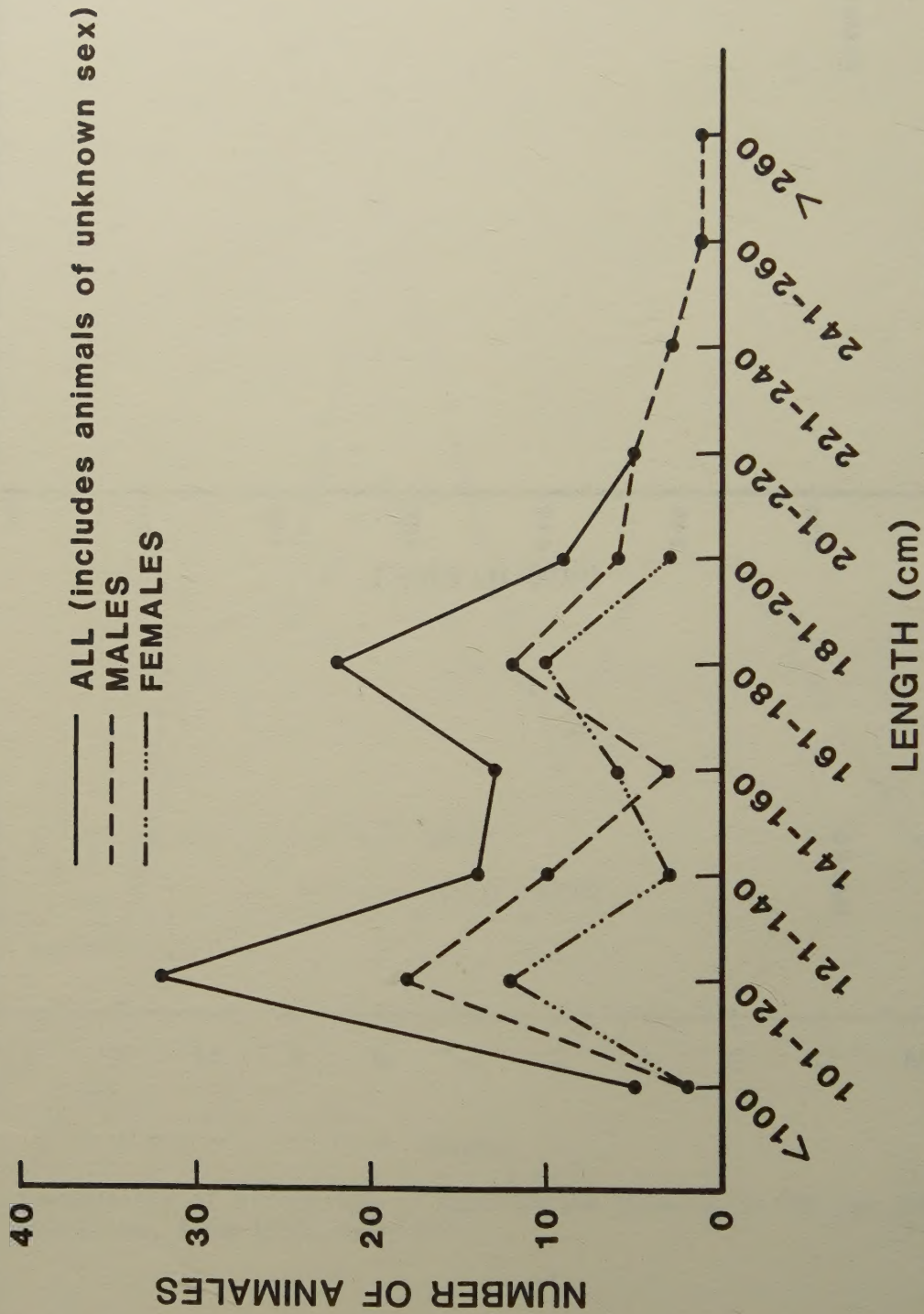


Figure 4. Number of stranded dead California sea lions, *Zalophus californianus*, investigated in San Diego County, California, during 1981, arranged by lengths.

